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not be enumerated, but the depth of his thinking and charm of his style may be judged from his great Address on Lobachévski, which it was my good fortune to give to the world in a *literal* translation, not a paraphrase. This translation was greeted by a tremendous outburst of enthusiasm in the mathematical world.

It must here suffice to give a few detached sentences from a mass of letters sent me. "I am astonished to find these researches of such deep philosophical import," writes Professor Daniels of the University of Vermont. "I have read it with intense interest," says Cajori. "This life and work of Lobachevski will be a grand inspiration to mathematicians," says Zerr. "I rejoice that you, 'in the midst of the virgin forests of Texas,' are able to do this work," says Professor Carman. "It will arouse a deeper enthusiasm for scientific achievement and widen the horizon of every reader. Surely no mathematician should miss this gem from farthest Russia," says Dr. L. E. Dickson. "By translating this most interesting Address, you have earned for yourself a title to the thanks of the mathematical world," says Dr. Paul Staeckel, since so well known in this very line. I sent this translation in 1894 to Professor Friedrich Engel of Leipzig, to whom I afterward offered for translation into German my translation of Lobachevski's largest work, "New principles of Geometry with complete theory of parallels." He issued the Address in 1895, saying in his *Nachwort:* "Ich habe die Wassiljefsche Rede nach dem Original uebersetzt, obwohl bereits eine englische Uebersetzung von *G. B. Halsted* (Austin, Texas, 1894) vorlag ; es schien mir aber fuer einen Deutschen nicht passend, eine russische Schrift nach einer englishen Uebersetzung zu uebertragen. Selbstverständlich habe ich aber die Halstedsche Uebersetzung ueberall verglichen und bekenne gern, dass sie mir an manchen Stellen gute Dienste geleistet hat."

A French translation and an (incomplete) Spanish translation have since appeared.

This transcendently beautiful production, linking forever the name of Vasiliev with that of Lobachevski, wins both for author and object, the love of every reader.

A personal picture with scene at Kazan the ancient capital of the Tartars, must be reserved for a subsequent chapter : "A Visit to Vasiliev."

NEW AND OLD PROOFS OF THE PYTHAGOREAN THEOREM.

By BENJ. F. YANNEY, A. M., Mount Union College, Alliance, Ohio, and JAMES A. CALDERHEAD, B. Sc., Curry University, Pittsburg, Pennsylvania.

[Continued from October Number.]

LVIII. Fig. 29.

$ALMI$ is equivalent to $2IAC=2BAE$ is equivalent to $ACDE$.

$BKML$ is equivalent to $BKNC$ is equivalent to $BCFH$.

$\therefore ABKI$ is equivalent to $ACDE+BCFH$.

LIX. Fig. 29.
$QIK = RAB$. $BOP = AFQ$. $OHKP = DEAR$.
$\therefore ABKI$ is equivalent to $ACDE + BCFH$.

LX. Fig. 29.
BHK is equivalent to $AFQ + DEAR$.
Then $BAIK$ is equivalent to $BRQK$.
$\therefore ABKI$ is equivalent to $ACDE + ACFH$.

LXI. Fig. 29.
$ABTS$ is equivalent to $2ABH$ is equivalent to $BCFH$.
$STKI = ALMI$ is equivalent to $ACDE$.
$\therefore ABKI$ is equivalent to $ACDE + BCFH$.

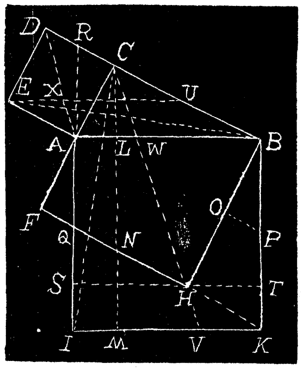

Fig. 29.

LXII. Fig. 29.
Same as in LXI, except that
$STKI$ is equivalent to $ABUE$ is equivalent to $ACDE$.

LXIII. Fig. 29.
$WBKV$, the half of $ABKI$, is equivalent to $BWH + BHK + HVK$.
But $BHK = BCA$ is equivalent to $BWC + DXE$; and $HVK = AXE$.
$\therefore \frac{1}{2}ABKI$ is equivalent to $\frac{1}{2}ACDE + \frac{1}{2}BCFH$.
$\therefore ABKI$ is equivalent to $ACDE + BCFH$.

LXIV. Fig. 30.
$MAF = NFA$. Then, $KLI = FCD$.
$ILN = DEM$. $BHK = BCA$.
$\therefore ABKI$ is equivalent to $ACDE + BCFH$.

LXV. Fig. 30.
$KHI = DEF$ is equivalent to $\frac{1}{2}ACDE$.
$HIL = ALF$.
$ILA = DEF$ is equivalent to $\frac{1}{2}ACDE$.
$BHK = BCA$.
$\therefore ABKI$ is equivalent to $ACDE + BCFH$.

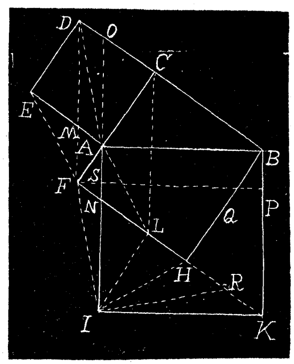

Fig. 30.

LXVI. Fig. 30.
$LNOC$ is equivalent to $LFDC - NFDO$ is equivalent to $ACDE$.
For $LFDC$ is equivalent to $ACDE + 2FAE$, and $2FAE$ is equivalent to $2FAD$ is equivalent to $NFDO$.
Also, $KLCB$ is equivalent to $BCFH$.
$\therefore KNOB$ is equivalent to $ACDE + BCFH$.
But, $ABKI$ is equivalent to $KNOB$.
$\therefore ABKI$ is equivalent to $ACDE + BCFH$.

LXVII. Fig. 30.

$ISPK$ is equivalent to $2IFK=2ADB$ is equivalent to $2ACB+ACDE$ is equivalent to $ACB+FHQ+ACDE$.

$SABP$ is equivalent to $FABQ$.

$\therefore$ $ABKI$ is equivalent to $ACDE+BCFH$.

LXVIII. Fig. 30.

$ILR=ACD$, and $ILF=AED$.

Then $IRK=IFA$. $BHK=BCA$.

$\therefore$ $ABKI$ is equivalent to $ACDE+BCFH$.

LXIX. Fig. 30.

$LNOC$ is equivalent to $2LAC=2FED$ is equivalent to $ACDE$.

$KLCB$ is equivalent to $BCFH$.

$\therefore$ $ABKI$ is equivalent to $KNOB$ is equivalent to $ACDE+BCFH$.

[To be Continued.]

NON-EUCLIDEAN GEOMETRY: HISTORICAL AND EXPOSITORY.

By GEORGE BRUCE HALSTED, A. M. (Princeton); Ph. D. (Johns Hopkins); Member of the London Mathematical Society; and Professor of Mathematics in the University of Texas, Austin, Texas.

[Continued from October Number.]

PROPOSITION XXIX. *Resuming Fig. 33 of the preceding proposition: I say every straight AC, which cuts angle BAX, finally at a finite or terminated distance (even in hypothesis of acute angle) will meet BX in a certain point P, if only AC be produced ever more toward the parts of the points X.*

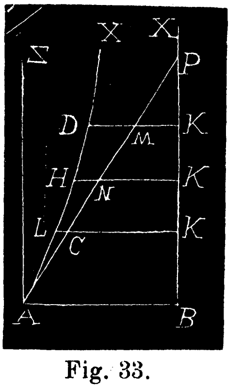

Fig. 33.

Proof. And firstly indeed (lest straight AC include space with AX) it must meet at finite distance the straights LK, HK, DK in certain points C, N, M; must meet, I say, unless before (and that at a finite distance, just as we maintain) it meets BX in some point between the point B and one of the points K.

Then (from Corollary I. after XXIII.) the angles ACK, ANK, AMK will be obtuse.

Moreover those angles, always obtuse, approach (from the preceding proposition) without any certain limit, to equality with a right angle, when indeed that AC is supposed to meet BX only at an infinite distance. Therefore such an ordinate KMD can be reached that at it the angle AMK